NON-PUBLIC?: N
ACCESSION #: 8903220424
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Beaver Valley Power Station, Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000412

TITLE: Reactor Trip to Main Feedwater Regulating Valve Failure
EVENT DATE: 02/12/89 LER #: 89-003-00 REPORT DATE: 03/14/89

OPERATING MODE: 1 POWER LEVEL: 055

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Mr. Thomas P. Noonan, Plant Manager TELEPHONE: (412) 643-1258

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO EXPECTED SUBMISSION DATE:

ABSTRACT:

On 2/12/89, with the Unit in Power operation, a power reduction from 90% reactor power to 50% reactor power was in progress as part of End of Core Life programs. At 0048 hours, operators noticed erratic operation of the "C" Main Feedwater Regulating Valve (MFRV). The operators placed the "C" MFRV in manual to control steam generator level. At 0108 hours at approximately 55% reactor power, the "A" Main Feedwater Pump was shutdown to reduce the pressure differential across the valve allowing easier valve movement and control. At 0120 hours, a turbine trip/reactor trip occurred due to a high water level in the "C" steam generator. The operators stabilized the plant in Hot Shutdown utilizing the Emergency operating Procedures. The "C" MFRV was found to have sheared anti-rotation pins and the stem detached from the valve plug. The cause for the valve failure was attributed to hydraulic forces and vibration acting over time. The MFRVs were all disassembled, inspected and repaired as necessary. This event was reported to the Nuclear Regulatory Commission at 0300 hours, in accordance with 10CFR50.72.b.2.ii. There were no safety implications to the public as a result of this event. This type of event has previously been analyzed as stated in the Updated Final Safety Analysis Report, Section /10 15.1.2, "Feedwater System Malfunctions Causing an Increase

In Feedwater Flow".

END OF ABSTRACT

DESCRIPTION

On 2/12/89, with the Unit in Power Operation (Operating Mode 1), operations personnel were reducing reactor power from 90% to 50% as part of End of Core Life programs. Prior to the Operating crew assuming the shift at 2300 hours on 2/11/89, the "B" Main Feedwater Regulating Valve (MFRV) had previously exhibited erratic valve control for steam generator water level. The "B" MFRV was in the automatic mode, however, the valve was not controlling smoothly. At 0048 hours, operators noticed erratic operation of the "C" MFRV. At 0108 hours, at approximately 55 % power, the "A" Main Feedwater Pump was shutdown. At 0120 hours, the water level in the "C" steam generator increased to the high-high level setpoint (75%) causing a turbine trip and feedwater isolation signal. The turbine trip caused a reactor trip, since reactor power was above the trip permissive of 49%. The feedwater isolation signal caused the following actions to occur: 1) trip of the running main feedwater pump, 2) auto-start of the auxiliary feedwater pumps, and 3) closure of the main feedwater regulating valves and bypass valves. Following the reactor trip, the operators utilized the Emergency Operating Procedures (E-0 "Reactor Trip or Safety Injection" and ES-0.1 "Reactor Trip Response") to stabilize the plant in Hot Standby (Operating Mode 3).

APPARENT CAUSE OF THE EVENT

The cause for this event was attributed to the failure of the "C" Main Feedwater Regulating Valve (2FWS*FCV498). This valve is a Copes-Vulcan, Model No. D-100-160, Part No. 16-FA37RG. The valve failure was attributed to the hydraulic forces and vibration, which over time, mechanically excite the valve, damaging the anti-rotation cage slots, plug guides, retaining pins and valve stem. The "B" Main Feedwater Regulating Valve was found to have damaged anti-rotation pins.

CORRECTIVE ACTIONS

The following corrective actions were taken as a result of this event:

Immediate:

1). Operations personnel utilized the Emergency Operating Procedures to

stabilize the plant in Hot Standby.

2). The main feedwater regulating valves were disassembled and inspected. The anti-rotation pins were replaced on all main feedwater regulating valves.

Long-term:

1). An Engineering Memorandum has been generated requesting Engineering to identify an actuator and valve design which will eliminate the main feedwater regulating valve problems due to the hydraulic forces and vibration which over time, progressively damage the valves.

2). All three steam generators will be inspected during the First Refueling Outage for potential loose objects.

SAFETY IMPLICATIONS

There were no safety implications to the public as a result of this event. This type of event has previously been analyzed as stated in the Updated Final Safety Analysis Report (UFSAR), Section 15.1.2, "Feedwater System Malfunctions Causing an Increase in Feedwater Flow". Additionally, all the required Engineered Safety Features (ESF) system components actuated as follows as a result of the steam generator high-high water level condition:

1). Turbine trip, causing a reactor trip because reactor power was greater than the P-9 trip permissive,

2). Feedwater Isolation (FWI) signal, causing the following:

A). Trip of the running main feedwater pump,
B). Automatic start of the auxiliary feedwater pumps 2FWE*P22, 23A and 23B),
C). Closure of the main feedwater regulating valves and bypass valves.

In addition, the Nuclear Steam System Supplier (NSSS) has evaluated the utility's engineering interpretation of the Steam Generator Parametric Loose Object Licensing Report (WCAP-12101), which addressed the safety significance of the potential loose part (anti-rotation pin from 2FWS*FCV498) which could be trapped in the "C" steam generator tubesheet annulus. It was concluded that the estimated time required for the loose object to wear into a tube to the minimum allowable wall thickness, is 2.4 years. The NSSS concurred with

this safety evaluation justifying continued operation of the remaining operating cycle.

REPORTABILITY

This event was reported to the Nuclear Regulatory Commission at 0300 hours in accordance with 10CFR50.72.b.2.ii. This written report is being provided in accordance with 10CFR50.73.a.2.iv, as an event involving a reactor protection system (RPS) or engineered safety features (ESF) system actuation.

PREVIOUS OCCURRENCES

There have been no previous Licensee Event Reports issued on this type of event/equipment failure at Beaver Valley Power Station Unit 2.

ATTACHMENT 1 TO 8903220424 PAGE 1 OF 2

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March 14, 1989
ND3SPM:0422

Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
LER 89-003-00

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

In accordance with Appendix A, Beaver Valley Technical Specifications, the following Licensee Event Report is submitted:

LER 89-003-00, 10 CFR 50.73 a.2.iv, "Reactor Trip Due to Main Feedwater Regulating Valve Failure".

Very truly yours,

T. P. Noonan
Plant Manager

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Attachment

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March 14, 1989
ND3SPN:0422
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